

WHAT IS CLAIMED IS:

1. A bus arbiter operable to arbitrate data transfer requests among plural modules connected to a bus, the bus arbiter comprising:

a slot allotment period storing unit operable to store information of a slot allotment period including plural slots;

a reserved-slot-number storing unit operable to store information of a reserved slot number, the reserved slot number being a slot number previously allotted to a predetermined module of the plural modules;

a remaining-reserved-slot-number storing unit operable to store information of a remaining reserved slot number, the remaining reserved slot number being a difference between a total slot number constituting the slot allotment period and the reserved slot number;

a remaining-slot-number calculating unit operable to calculate a remaining slot number of the reserved slot number each time when a data transfer request is permitted for the predetermined module to which the reserved slot number is allotted, and operable to calculate a remaining slot number of the remaining reserved slot number each time when a data transfer request is permitted for the module that uses the remaining reserved slot number;

a first renewed-slot-number storing unit operable to store, as an initial value, information of the reserved slot number stored in said reserved-slot-number storing unit, and operable to store information of the remaining slot number of the reserved slot number, the remaining slot number being calculated by said remaining-slot-number calculating unit;

a second renewed-slot-number storing unit operable to store, as an initial value, information of the remaining reserved slot number stored in said remaining-reserved-slot-number storing unit, and operable to store information of the remaining slot number of the remaining reserved slot number, the remaining slot

number being calculated by said remaining-slot-number calculating unit;

a plurality of renewed-slot-number-designating storing units operable to store information designating said first renewed-slot-number storing unit or said second renewed-slot-number storing unit, each thereof being installed corresponding to the plural modules and allotted to the corresponding module;

a transfer-permissible-candidate determining unit operable, in response to a request of data transfer from the module, to generate a transfer-permissible-candidate notifying signal indicating that the module is a candidate for which a data transfer request is permitted only when, referring to either said first renewed-slot-number storing unit or said second renewed-slot-number storing unit designated by the information stored in said renewed-slot-number-designating storing unit that corresponds to the module, a remaining slot number still remains, the remaining slot number being stored in either said first renewed-slot-number storing unit or said second renewed-slot-number storing unit that is referred; and

a transfer permission determining unit operable, according to a predetermined rule, to determine permission for the data transfer request from the module designated by the transfer-permissible-candidate notifying signal;

wherein information indicating said first renewed-slot-number storing unit is stored in said renewed-slot-number-designating storing unit corresponding to the predetermined module to which the reserved slot number is allotted,

wherein information indicating said second renewed-slot-number storing unit is stored in said renewed-slot-number-designating storing unit corresponding to the predetermined module that uses the remaining reserved slot number;

wherein information of the reserved slot number stored in said reserved-slot-number storing unit is stored, as an initial value, into said first renewed-slot-number storing unit each time when the slot allotment period elapses; and

wherein information of the remaining reserved slot number stored in said

remaining-reserved-slot-number storing unit is stored, as an initial value, into said second renewed-slot-number storing unit each time when the slot allotment period elapses.

2. A bus arbiter as defined in claim 1, wherein

plural pieces of the predetermined module are connected to the bus;

plural pieces of said reserved-slot-number storing unit are provided corresponding to the plural pieces of the predetermined module; and

plural pieces of said first renewed-slot-number storing unit are provided corresponding to the plural pieces of said reserved-slot-number storing unit.

3. A bus arbiter as defined in claim 1, wherein, when the remaining slot number of the reserved slot number is exhausted, said remaining-slot-number calculating unit notifies a manager-assigned module of the plural modules that the predetermined module, to which the reserved slot number is allotted, has spent all the reserved slot number.

4. A bus arbiter operable to arbitrate data transfer requests among plural modules connected to a bus, the bus arbiter comprising a remaining-reserved-slot-number storing unit operable to store information of a remaining reserved slot number, the remaining reserved slot number being a difference between a slot number of a slot allotment period including plural slots and a reserved slot number, the reserved slot number being a slot number previously allotted to a predetermined module of the plural modules.

5. A bus arbiter as defined in claim 4, further comprising a slot allotment period storing unit operable to store information of the slot allotment period.

6. A bus arbiter as defined in claim 4, further comprising a reserved-slot-number storing unit operable to store information of the reserved slot number.

7. A bus arbiter as defined in claims 4, wherein, when the predetermined

module has spent all the reserved slot number, a manager-assigned module of the plural modules is notified that all the reserved slot number is spent.

8. A bus arbiter as defined in claims 4, wherein plural pieces of the predetermined module are provided, and said remaining-reserved-slot-number storing unit stores information of a remaining reserved slot number, the remaining reserved slot number being a difference between the slot number constituting the slot allotment period and a sum of plural pieces of the reserved slot number.

9. A bus arbiter operable to arbitrate data transfer requests among plural tasks managed by a task manager connected to a bus, the bus arbiter comprising:

- a slot allotment period storing unit operable to store information of a slot allotment period including plural slots;

- a reserved-slot-number storing unit operable to store information of a reserved slot number, the reserved slot number being a slot number previously allotted to a predetermined task of the plural tasks;

- a remaining-reserved-slot-number storing unit operable to store information of a remaining reserved slot number, the remaining reserved slot number being a difference between a total slot number constituting the slot allotment period and the reserved slot number;

- a remaining-slot-number calculating unit operable to calculate a remaining slot number of the reserved slot number each time when a data transfer request is permitted for the predetermined task to which the reserved slot number is allotted, and operable to calculate a remaining slot number of the remaining reserved slot number each time when a data transfer request is permitted for the task that uses the remaining reserved slot number;

- a first renewed-slot-number storing unit operable to store, as an initial value, information of the reserved slot number stored in said reserved-slot-number storing unit, and operable to store information of the remaining slot number of the reserved slot

number, the remaining slot number being calculated by said remaining-slot-number calculating unit;

a second renewed-slot-number storing unit operable to store, as an initial value, information of the remaining reserved slot number stored in said remaining-reserved-slot-number storing unit, and operable to store information of the remaining slot number of the remaining reserved slot number, the remaining slot number being calculated by said remaining-slot-number calculating unit;

a plurality of renewed-slot-number-designating storing units operable to store information designating said first renewed-slot-number storing unit or said second renewed-slot-number storing unit, each thereof being installed corresponding to the plural tasks and allotted to the corresponding task;

a transfer-permissible-candidate determining unit operable, in response to a request of data transfer from the task, to generate a transfer-permissible-candidate notifying signal indicating that the task is a candidate for which a data transfer request is permitted only when, referring to either said first renewed-slot-number storing unit or said second renewed-slot-number storing unit designated by the information stored in said renewed-slot-number-designating storing unit that corresponds to the task, a remaining slot number still remains, the remaining slot number being stored in either said first renewed-slot-number storing unit or said second renewed-slot-number storing unit that is referred; and

a transfer permission determining unit operable, according to a predetermined rule, to determine permission for the data transfer request from the module designated by the transfer-permissible-candidate notifying signal;

wherein information indicating said first renewed-slot-number storing unit is stored in said renewed-slot-number-designating storing unit corresponding to the predetermined task to which the reserved slot number is allotted,

wherein information indicating said second renewed-slot-number storing unit is

stored in said renewed-slot-number-designating storing unit corresponding to the predetermined task that uses the remaining reserved slot number;

wherein information of the reserved slot number stored in said reserved-slot-number storing unit is stored, as an initial value, into said first renewed-slot-number storing unit each time when the slot allotment period elapses; and

wherein information of the remaining reserved slot number stored in said remaining-reserved-slot-number storing unit is stored, as an initial value, into said second renewed-slot-number storing unit each time when the slot allotment period elapses.

10. A bus arbiter as defined in claim 9, wherein

plural pieces of the predetermined task are present;

plural pieces of said reserved-slot-number storing unit are provided corresponding to the plural pieces of the predetermined task; and

plural pieces of said first renewed-slot-number storing unit are provided corresponding to the plural pieces of said reserved-slot-number storing unit.

11. A bus arbiter as defined in claim 9, wherein, when the remaining slot number of the reserved slot number is exhausted, said remaining-slot-number calculating unit notifies the task manager that the predetermined task, to which the reserved slot number is allotted, has spent all the reserved slot number.

12. A bus arbiter operable to arbitrate data transfer requests among plural tasks managed by a task manager connected to a bus, the bus arbiter comprising a remaining-reserved-slot-number storing unit operable to store information of a remaining reserved slot number, the remaining reserved slot number being a difference between a slot number of a slot allotment period including plural slots and a reserved slot number, the reserved slot number being a slot number previously allotted to a predetermined task of the plural tasks.

13. A bus arbiter as defined in claim 12, further comprising a slot allotment

period storing unit operable to store information of the slot allotment period.

14. A bus arbiter as defined in claim 12, further comprising a reserved-slot-number storing unit operable to store information of the reserved slot number.

15. A bus arbiter as defined in claims 12, wherein, when the predetermined task has spent all the reserved slot number, the task manager is notified that all the reserved slot number is spent.

16. A bus arbiter as defined in claims 12, wherein plural pieces of the predetermined task are present, and said remaining-reserved-slot-number storing unit stores information of a remaining reserved slot number, the remaining reserved slot number being a difference between the slot number constituting the slot allotment period and a sum of plural pieces of the reserved slot number.